

# Influence of Personality Traits on the Adoption of Mobile Learning

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**Abstract** — Mobile learning (M-learning) can provide online communication between learners and tutors. Analyzing the factors that affect the adoption of mobile learning can help universities to implement this technology. On the other hand, successful adoption of this method depends not only on students' satisfaction, but also on their intent to continue using it. People have different ideas about accepting a new technology based on their personality traits. Therefore, personality trait can be an effective factor in M-learning adoption. The proposed model of this study which analyzes the influence of personality traits on the adoption of Mobile Learning in University Technology Malaysia has Eleven Hypothesis. The model includes two parts: (a) the hypotheses related to the adoption of a new technology and (b) the hypotheses related to personality traits of students. TAM and BIG FIVE are the most compatible models to be used as the research models for adoption and personality traits of the participants of the present study. The results obtained from the proposed models are related to the impact of personality traits on the adoption of M-learning.

**Keywords** – Adoption; personality traits; mobile learning

## 1. INTRODUCTION

According to [2], “big revolution in information and communication technology (ICT) has been a basic source of the fundamental changes and a key driving force for innovation and learning”. Globalization, business networking, and enterprise transformation have been shaped after rapid developments in ICT. Nowadays, training and education cannot ignore the use of mobile devices in learning processes because of the wireless technology and mobile devices. Students tend to benefit from mobile and small devices to enhance the learning process using all existing systems [3]. Years ago, proposing the ideas and methods of delivering the educational contents on the personal computers that were located at the learner's home or office was the major focus. These computers were very heavy and had large screens. On the other hand, students and lecturers had a big motivation to use mobile devices for educational purposes.

Learning Management Systems (LMS) have been used by many universities to make a flexible learning environment through promoting the collaboration and online communication. Although LMS recommends many advantages to students, the problem of this breakthrough is that it really needs a computer terminal. Recently, some educational centers use Short Message Service (SMS) for learning purposes. Organizations or institutes are required to introduce mobile delivery methods based on the interests of students to adopt and use mobile devices and this is the most proper time to begin this new educational step [3]. Therefore, we can have educational world anytime and anywhere.

According to numerous universities that have employed some teaching and learning devices like PC and the Internet in learning procedure, Mobile Learning (M-learning) is a technology that improved the student's learning experience. Using electronic learning (E-learning) materials on mobile devices such as personal digital assistants (PDAs), Tablet PCs, mobile phones, Pocket PCs, palmtop computers and in general, any device that is small and autonomous help us to learn at every moment of our life [4].

M-learning combines E-learning and mobile computing as a new model of E-learning. With this new technology, learner-centered and informal learning will replace teacher-centered and formal learning. “In E-learning systems, learners are not restricted to a particular content system (interoperability), and the material does not have to be rewritten if the course or an interactive training electronic manual is updated. In this way, the development of a high quality course avoids duplicating effort from the design process (reusability)” [5] Successful adoption of a new technology depends not only on students' satisfaction, but also on their intent to continue using it [1]. The aim of this paper is to discuss and propose a model which shows the impact of personality traits on the adoption of M-learning.

## 2. RELATED WORK

### A. Moving from E-learning to M-learning

Researchers believe that M-learning is advanced E-learning with portability features. Changes in technology have replaced E-learning with M-learning or technology of mobility. Some differences between M-learning and E-learning in learning environment have been shown in Table 1.

TABLE 1: Differences between M-learning and E-learning in learning environment

<b>M-learning</b>	<b>E-learning</b>
Flexible	Formal
GPRS, G3, Bluetooth	Bandwidth
Small and mobile devices	Internet and PC
objects	Multimedia
Instinctive	Interactive

### B. Mobile learning Definitions

From the perspective of M-learning, using mobile phone's functions and applications have significant and good effect on learning process. On the other hand, from an educational view, a combinatory learning process using technologies can improve the education progress. [6] In recent years, M-learning definitions have focused on the mobile devices and their features to find some ways to make the schooling process easier and help the involved learners.

For instance, "E-learning is a learning supported by digital electronic tools and media, and-learning is an E-learning that uses mobile devices and wireless transmission" [7]

According to Aad et al. [7], "M-learning is a type of learning which happened using tools that a woman could carry in her purse or a man can carry in his pocket. Therefore, M-learning can be defined as the appearance of education and training on palmtops, handhelds, PDAs, smart and mobile phone".

Technologically speaking, M-learning is defined as "any educational provision where the sole or dominant technologies are handheld or palmtop devices" [8]. He believes that we should look at M-learning from two points of view: learner's opinion and user's point of view.

### C. Adoption and Individuals' Differences

Not all people accept a new idea or product in the same way. For example, some people accept the idea at early stages and immediately after facing it. The second group accepts it after a long time, and the third group never accepts it. Individuals can be divided into five different groups based on their traits in selecting new ideas or technologies. The first group consists of innovators and pioneers. They are the first people who accept a new technology. Some of the features of this group are being brave, risky, and active in the society. Early adopters are in the second group. This group of people is more involved in the formal activities of the community. These dreamer people consider both willingness in technology and worry about its risks. The third group is in majority. This group of people is ready to use new technology, but they need some assistance. They cannot be pioneer or risk taker. In educational part, just early adopters and innovators are using and exploring M-learning and the rate of using mobile phone is different in them. Learners and teachers have insufficient information about the advantages of M-learning, and this is a reason for the current situation [9].

### D. Factors Influencing Adoption of M-Learning

For selecting and using the recent technologies in educational environments, students and teachers have different manners and these behaviors have many indicators. A critical matter that can ease the adoption procedure is realizing these factors. Based on the review of literature, there are four factors in TAM model including enjoyment, self- efficiency, playfulness, and facilitating conditions which are the major and critical factors as opposed to the other ones [10].

### E. Comparing Big Five model and MBTI model

Generally, both instruments are Standard and measure character, however; they measure characters in different ways. Whilst the Big five model is an instrument based on traits and empirical research, the MBTI is a kind of instrument which is based on psychology. In addition, the 2008 Technical Manual for The Birkman Method [11]and extensive studies show

that their scales are completely different. Deeper comparison of the two methods shows that the Big Five model is a better instrument for individuals and this survey studies the influence of individuals' personality on education. Big five model facilitates self management and interpersonal effectiveness in environments such as the educational ones. [10]. In conclusion, Big five model is suitable to be used to determine the effect of students' personality on M-learning.

### 3. METHODOLOGY

This paper is specifically devoted to reviewing the literature on how personality traits can influence the adoption of Mobile learning among students of two faculties. The researcher employed a three-stage method to identify, propose and provide the literature-based findings. The first stage involved identifying the personality traits models related to the adoption of mobile learning (M-learning). The second stage involved proposing a mobile learning (M-learning) adoption model that includes personality traits. The third stage analyzed the details and provided recommendations for the adoption of mobile learning (M-learning) by students. Figure 1 shows the operational framework of the present study.

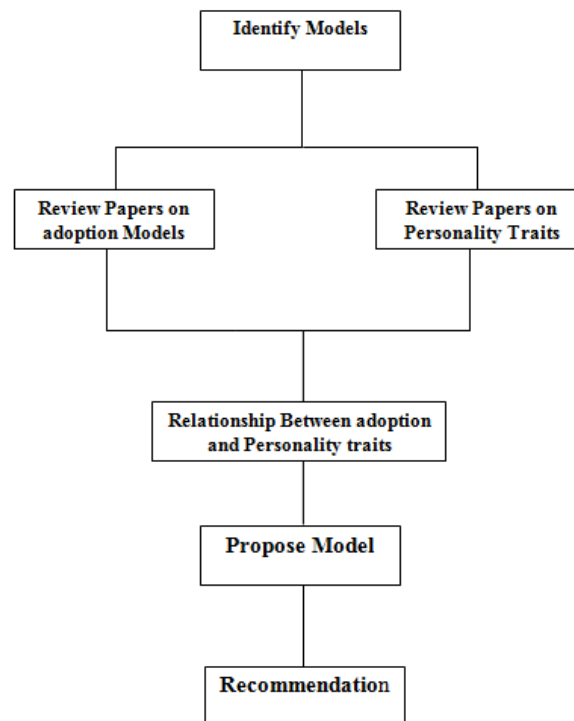


Figure 1: Operational Framework

In this regard, the researcher reviewed 30 studies on the influence of personality traits on the adoption of a new technology in educational domain. Reviewing these studies consisted of two stages. At the first stage, the focus was on reviewing the studies that included adoption models in educational domain. The focus of the second stage was studying the studies that analyzed personality traits. The protocol that the researcher followed was creating a folder for the studies and then sorting them based on their topics to find the similar studies. This could pave the way to find the required data about mobile learning and find the relation between personality traits and adoption.

The efforts of the researcher to compare several models of technology adoption such as TAM and UTAUT were successful and this led to constructing and proposing a research model. After comparing different models of adoption, the researcher found some crucial factors that are more important than the others and found a correlation between these models and personality traits models. So, the proposed model is considered a complementary model which shows the influence of personality traits on the adoption of mobile learning models.

#### 4. THEORIES ON THE INFLUENCE OF PERSONALITY TRAITS ON THE ADOPTION OF MOBILE-LEARNING

The adoption of a new technology can be analyzed using various models such as TRA and UTAUT. However, a common model that is used for the adoption of a new technology is TAM. In this regard, mobile learning is a new technology derived from E-learning and previous researcher used TAM model for the adoption of E-learning. However, there are many models that describe personality traits of human being such as MBTI and BIG FIVE. In this study, BIG FIVE model was used for the analysis of personality traits as discussed earlier. Generally, this study used two models: TAM and BIG FIVE.

##### A. Technology Acceptance Model (TAM)

Recently, all teachers and lecturers have found out that technology plays a significant role in education, especially at university level. In terms of personal and even global aspects of human beings' life, the role of technology is not ignorable. According to the critical analyses which have been conducted on Theory of Planned Behavior (TPB), Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) models, some factors affect these models. The attitudes and characteristics of users are the indicators which influenced the adoption of M-learning in education.

TABLE 2: Comparison different models

PAPERS	mobility	quality	Task value	Self-management	enjoyment	Self-efficiency	playfulness	Near-term usefulness	Long-term usefulness	Compatibility	Innovation	Trust	attitudes	subjective norm	behavioral control	social network	performance expectancy	effort expectancy	facilitating condition	observability	social influence	experience	anxiety	MODELS
1	✓	✓	✓	✓	✓	✓																		TAM
2				✓			✓																	UTAUT
3								✓	✓															TAM
4					✓	✓				✓	✓	✓												TAM
5	✓				✓																			TAM
6													✓	✓	✓									TPB
7																✓								TAM
8																	✓	✓	✓	✓				UTAUT
9																			✓		✓			TAM
10							✓															✓	✓	TAM
11						✓							✓	✓										TAM
12							✓												✓		✓			TAM

Table 2 shows the discussion of the three above mentioned theories. Theory of Planned Behavior (TPB) does not include the individual part while personality is one of the antecedents of individual part. So, this model is rejected. On the other hand, the UTAT model includes the individual part but it investigates the individual in terms of experience, age, and gender. However, the current study investigates the personality traits. In this regard, TAM was the most suitable model to be used in this study.

## **B. BIG FIVE MODEL**

Goldberg proposed the Big Five personality factor model in 1982 and he confirmed this model later in 1990. Personal characteristics, patterns of thinking, feeling, behaving, and responding to environmental demands are the main factors of the initial theory of the Big Five model. These factors can be explained in terms of their scores on five personality domains [14]

- i. Agreeableness: Being “courteous, flexible, trusting, and good-natured. People that demonstrate these characteristics also can be considered optimistic and get value along with others.
- ii. Openness to Experience: Behaviors such as “being imaginative, cultured, curious. Individuals with these characteristics are looking for new opportunities to reveal their creativity”.
- iii. Extroversion: Sociable, gregarious, assertive, talkative, and active people can get a high score in terms of the extroversion scale [15]. Extroversion moderates the relationship between social norms and intention to use technology [16]
- iv. Conscientiousness: Being careful, thorough, responsible, organized, and playful reflect dependability traits. Conscientious students and workers like to perform better on school and work-related tasks.
- v. Neuroticism: Emotions such as anxiety, worry, insecurity and depression among others are the elements of this personality trait [15]. When they face new issues such as learning a new form of technology, these people have many problems with its adoption. Sometimes, they easily avoid the new situation completely.

## **5. PROPOSED MODEL**

The researcher developed the conceptual model based on Technology acceptance model (TAM) and Big Five model. The adoption of a new technology may be affected by many factors including focus on technology itself, attitudes, and characteristics of the users. Based on [17], various models and theories have been used for better understanding of user-adoption especially in the educational environment because of the importance and complexity of why a user chooses or rejects a new technology. One of the best adoption models used to interpret the adoption of technologies is Technology Acceptance Model (TAM). This model refers to the influence of personality traits which influence the adoption of mobile learning (M-learning). This model has been selected based on research compatibility with other studies which used the same model in education. TAM is the most compatible model to be used as research model for this study.

The main constructs of TAM model are PEOU and PU. However, some authors such as Kim Flett [18] and [19] tried to add other different variables to TAM besides PEOU and PU to increase the power of TAM to explain the adoption of M-learning and determine the factors which affect this adoption by users. Some of them are perceived enjoyment, computer self-efficacy, and Big Five model as an external construct for identifying personality traits of students. This model can identify the relation between personality traits and the adoption of mobile learning (M-learning). This model connects well to the students who use E-learning at either a high or a low level because mobile learning is a new technology of E-learning. This model can provide recommendations for universities if they want to implement mobile learning in their educational environments.

The users show a higher desire to choose M-learning when they think that M-learning is easy to use and operate. According to Lee et al. (2005), the effect of Perceived Ease of use on students' intention is indirectly conducted through Perceived Usefulness. Then, we hypothesize that:

**H1:** Perceived ease of use will have positive effect on the perceived usefulness of M-learning.

According to TAM attitude toward using M-learning, perceived usefulness of M-learning and perceived ease of use of M-learning are main elements of the proposed model for M-learning adoption. One of the derivations of usage behavior and intention in TAM model is perceived usefulness. The diffusion of perceived usefulness is “the degree that a person believes that his or her performance improves by using a special system”. [20] M-learning provides a learning that is flexible. Perceived ease of use of M-learning can influence the desire and intention of user to choose M-learning positively. Students can learn anywhere and anytime that is convenient. Perceived usefulness has a significant effect on intention of students. It is also an extrinsic motivation which plays an important role in the acceptance of a new technology.

**H2:** Perceived Usefulness will have positive effect on Behavioral Intention.

For obtaining a specific level of performance, each person has a prediction about his abilities for managing and organizing some special sorts of action. This is the definition of Self-efficacy [21]. According to the below proposition, an

individual with high perception of self- efficacy of M-learning perceives this application easier for use. Computer Self-Efficacy revealed a strong positive influence on Perceived Ease of Use about internet-based learning systems.

**H3:** Self-efficacy will have positive effect on the perceived ease of use of M-learning

Perceived enjoyment and behavioral intention have a causal relationship. It means that when users consider M-learning enjoyable, this happiness motivates them to highly consider M-learning. Perceived Enjoyment is an extrinsic motivation like perceived usefulness and can influence intention of students. Venkatesh [22] proposed that perceived enjoyment affects users' choices indirectly.

**H4:** Perceived Enjoyment will have positive effect on behavior intention

Agreeableness: Being “good-hearted, relying, patient, friendly and soft-hearted” are the elements of this personality manner [15]. An agreeable person has a considerable interpersonal interaction and teamwork, especially when the interaction involves helping and cooperating with others. So, M-learning creates a cooperative environment with other student. People that demonstrate this characteristic can also be considered optimistic and they get value along with others.

**H5:** Agreeableness will have positive and direct effect on Perceived Enjoyment.

Openness to Experience: Behaviors such as “being genteel, original, sensitive, broad-minded, brave, and imaginative” describe openness to a new experience. Individuals with this characteristic look for new opportunities to reveal their creativity and have positive role in a useful new technology like M-learning.

**H6:** Openness to experience will have positive effect on perceived usefulness

Students who are pleasant and joyful accept modern opinions in the educational experience and are likely to be busy with a new experiment and may enjoy conversation and interactive learning. Openness and Extraversion are personality traits which describe engagement of students to enjoy a new technology like M-learning and these personality traits are related to extrinsic motivation.

**H7:** Openness will have positive and direct effect on Perceived Enjoyment.

Extroversion: Sociable, gregarious, assertive, talkative, and active people can get a high score in terms of the extroversion scale [15]. Extroversion moderates the communication among social norms and purposes for using technology [16]. Extraversion describes engagement of students to enjoy a new technology such as M-learning.

**H8:** Extraversion will have positive and direct effect on Perceived Enjoyment

Conscientiousness: Being careful, thorough, responsible, organized, and playful reflects dependability trait [15]. Conscientious individuals are flexible learners and time saving. These charectrectics realize that M-learning is convenient, it enhances job performance, and it is useful and has positive influence on the adoption of M-learning.

**H9:** Conscientiousness will have positive and direct effect on Perceived Usefulness

According to Landers and Lounsbury [23], using internet for academic purposes is associated with conscientiousness positively, but it shows a negative influence if it is used for other purposes because students use M-learning for educational purposes. Abecasis [24]found out that conscientiousness has a significant negative influence on perceived Enjoyment .

**H10:** Conscientiousness will have a significantly negative and direct effect on Perceived Enjoyment

Neuroticism: Individuals that show neuroticism do not like to try new experiences and they mostly have self-efficacy and self-esteem problems. When they face new issues such as learning a new form of technology, these people have many problems with its adoption. They would find M-learning useful for learning, interacting, discussing, and expressing them without going through the experience of face-to-face communication and interaction.

**H11:** Neuroticism will have positive direct effect on Perceived Usefulness.

There are two models used in this research. The aim of using these models is to identify the aspects that identify and provide users with the adoption of new technologies. The first model is TAM which is used to measure the user acceptance of the new technologies, and the second one is Big Five which is used to analyze personality traits of students for the adoption of a new technology such as mobile learning (M-learning). TAM has been applied in numerous studies to test users' acceptance of the new technology. Big Five is suitable to be the research model according to literature review, but the Big Five model is a better instrument for individuals and this survey studies the influence of individuals' personality on education. Big five model facilitates self management and interpersonal effectiveness in environments such as the educational ones. [11].

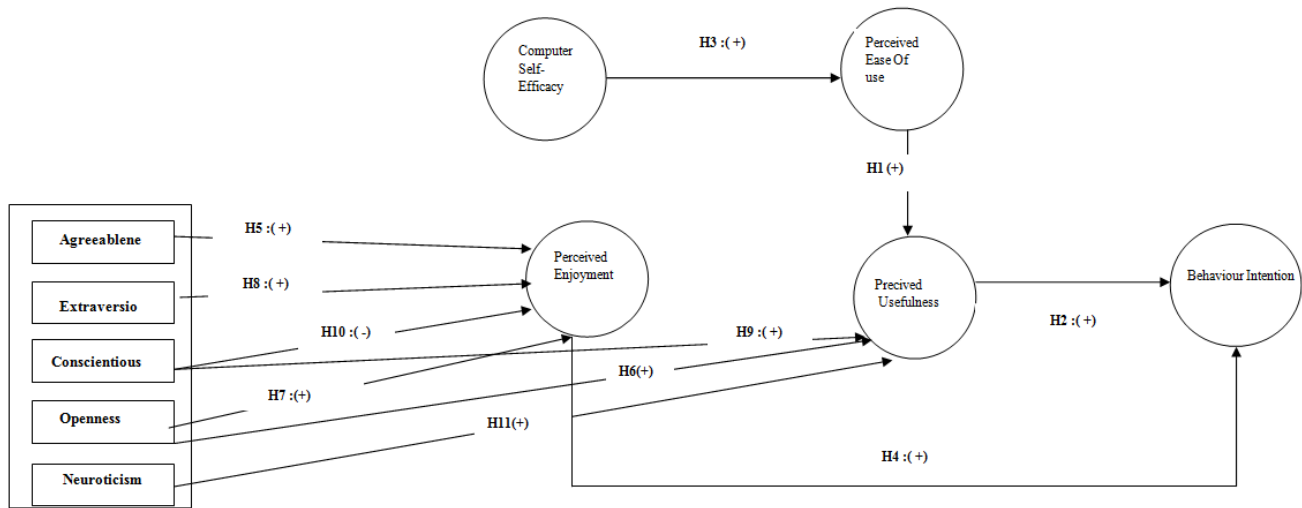


FIGURE 2: Research Model

## 6. CONCLUSION

In conclusion, the most important factors that influence the use of technology and how the new technology affects the users' learning are in the Mobile learning area. The relationship between personality traits factors and adoption readiness in education was revealed based on the research outcomes. According to the present study, it can be concluded that Mobile learning (M-learning) is a new technology. Therefore, more and in-depth studies should be conducted to identify all aspects of this important technology for educational purposes. Based on the results of the present study, all of the hypotheses are strongly supported and all of the factors can directly or indirectly affect M-learning adoption by students.

This study discussed factors that influence the adoption of Mobile learning (M-learning) as well as the relation between personality traits and adoption Mobile learning (M-learning). This study used TAM model for adoption and Big Five for personality traits. Future studies are required to develop a suitable way to implement Mobile learning (M-learning) and to investigate the importance of this implementation. So, it is needed for further studies to deeply investigate the factors of personality traits that influence the adoption of a new technology such as M-learning to a greater extent.

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